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BLUEPRINT

California Energy Commission
Efficiency Division

In This Issue

IAPMO-R&T Approved

The California Energy Commission (Energy Commission) has **approved** the International Association of Plumbing and Mechanical Officials, Research and Testing (IAPMO-R&T) to certify and rate solar water-heating systems and collectors.

IAPMO-RT maintains a list of products they have certified on their **website**.

Section 150.0(n)3 of the *2016 Building Energy Efficiency Standards* (Energy Code) requires solar water-heating systems and collectors to be certified and rated.

New Fact Sheet

The Energy Commission has developed a **Computer Rooms & Data Centers** fact sheet. This fact sheet summarizes the requirements in **Section 140.9(a)**.

New 2016 NRCC-LTO-E and NRCC-LTS-E

The new **NRCC-LTO-E** and **NRCC-LTS-E** are available. The NRCC-LTO-01-E through NRCC-LTO-04-E and NRCC-LTS-01-E were incorporated into two compliance documents (forms).

The new forms can be used for any nonresidential outdoor or sign lighting projects complying with the Energy Code.

These forms are project specific and expand based on the project scope.

Some of the new features include:

- One signature block
- Table C - Compliance Results gives a quick check of the inputs on the first page and will indicate if the project "COMPLIES"
- User selections limit drop-down menus and table options to guide users toward compliant designs
- Hyperlinks to the Energy Code

Enforcement agencies may continue to use the static forms at their discretion.

Appliance Efficiency Regulations for State Regulated Lamps

Effective January 1, 2018, general service LED lamps and small-diameter directional lamps will be regulated by the Title 20 Appliance Efficiency Regulations (Appliance Standards). State regulated LED lamps with screw base or GU-24 base, including LED retrofit kits designed for recessed can housings, must meet the requirements of the Appliance Standards to be sold or offered for sale in California.

What does this mean with regards to the Energy Code?

Only general service LED lamps and small-diameter directional lamps that are listed in the **appliance database** may be installed, per the requirements in **Section 110.1**. These lamps may also need to meet the 2016 Reference Joint Appendix JA8 (JA8) requirements per **Sections 110.9(e)** and **150.0(k)1A**.

What is the difference between the JA8 and state regulated lamp requirements?

For more information on the differences between the JA8 and state regulated lamp requirements, please review the article "**Title 24's JA8 and Title 20's State Regulated Lamp Requirements"** in *Blueprint,* Issue 117.

Separation of Electrical Circuits

The requirements for separation of electrical circuits (disaggregation of electrical circuits) have been simplified in the 2016 Energy Code. The 2013 Energy Code prescribed specific methods of separating electrical loads. The 2016 Energy Code allows any approach that provides the ability to measure the separate loads of the building.

2016 Energy Code vs. 2013 Energy Code

Section 130.5(b) of the 2013 Energy Code specifically required separate panelboards or subpanels for each load type. This design approach allows for measuring each electrical load at the feeder to the panelboard or subpanel using a current transformer (CT). See Figure 1 for an example of this design approach.

Another method for meeting the requirements is installing a complete metering and measurement system that measures each load type according to the requirements in Section 130.5(b). This method goes beyond the requirements of the Energy Code. Section 130.5(b) requires separation of electrical circuits to provide the capability to monitor individual loads at a later time. It does not require that meters and associated equipment such as CT's to be installed.

The 2016 Energy Code does not require a specific method or design approach for ensuring separation of electrical loads. Any design approach that provides the ability to measure separate loads according to **Section 130.5(b)** may be used.

For example, the system can be designed so that one panel contains multiple load types. Each branch circuit serves a single load type. This allows for measurement of separate loads at each branch circuit. See Figure 2 for an example of this design approach.

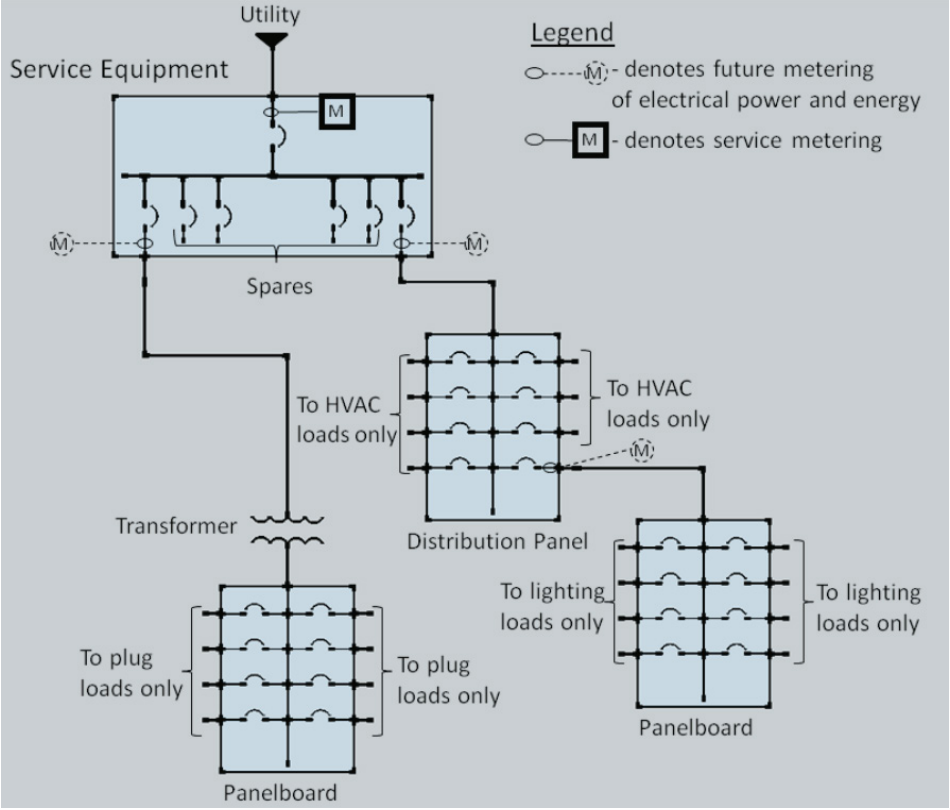

Figure 1 - Loads separated by panelboards and subpanels

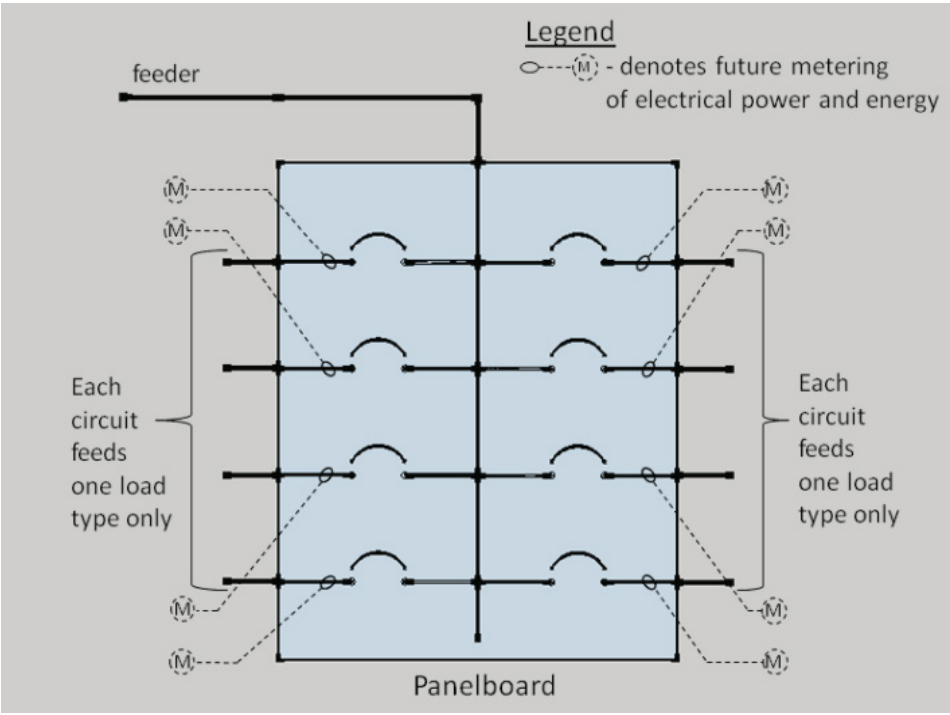

Figure 2 - Loads separated by individual branch circuits

Why Separate Electrical Circuits?

The purpose of separating electrical circuits is to set up a backbone for monitoring the contributions of separate loads to the overall energy use of the building. By designing the electrical power distribution system with separation of electrical loads in mind, energy monitoring can be readily setup and implemented without significant physical changes to the electrical installations. Monitoring the electrical energy usage of each load type provides valuable energy usage information to better understand how much energy has been used by each building system. Analyzing this energy information can help facilitate energy efficiency measures to improve building energy performance.

Conclusion

The 2016 Energy Code provides more flexibility for designing electrical power distribution systems. Whereas the 2013 Code required specific design approaches, the 2016 Code allows any design approach that provides the capability to separately monitor electrical load types according to **Section 130.5(b)**. **Chapter 8** of the *2016 Nonresidential Compliance Manual* provides a few examples, which show design approaches that may be used to meet code requirements.

Q&A

Residential Attic Insulation

When installing roof insulation in a residential attic, does the insulation need to be installed on the entire roof, including areas over unconditioned space?

It depends. The insulation should be installed at the roof either above or below the roof deck in one of the following ways:

1. If the attic is an open or undivided space, then the entire roof should be insulated. This includes portions of the roof over an unconditioned space such as a garage. This is illustrated in Figure 3.
2. If the attic has a continuous air barrier separating the attic over unconditioned space from the attic over conditioned space, then only the portions of the roof over conditioned space should be insulated. It is recommended, but not required, that the air barrier is also insulated. This is illustrated in Figure 4.

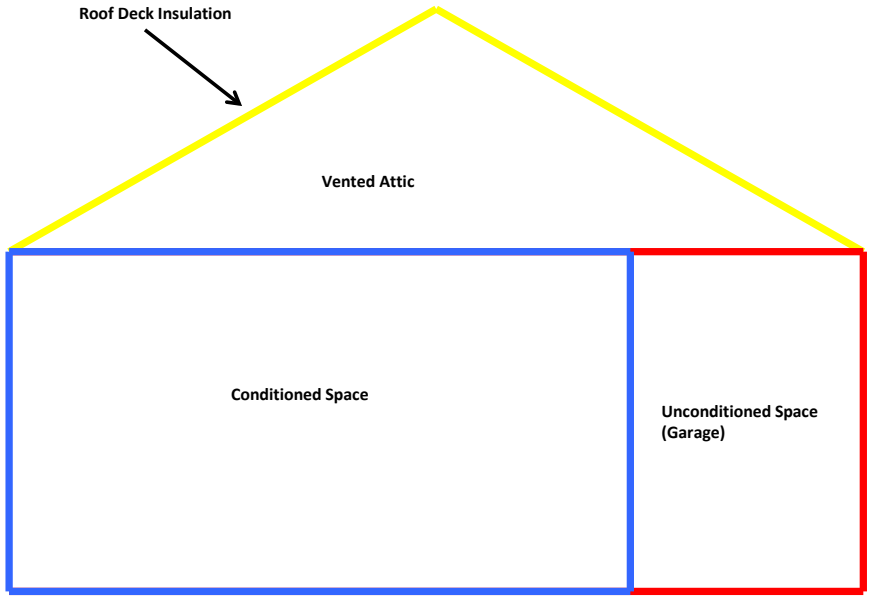

Figure 3 - House with attic insulation extending over conditioned and unconditioned spaces

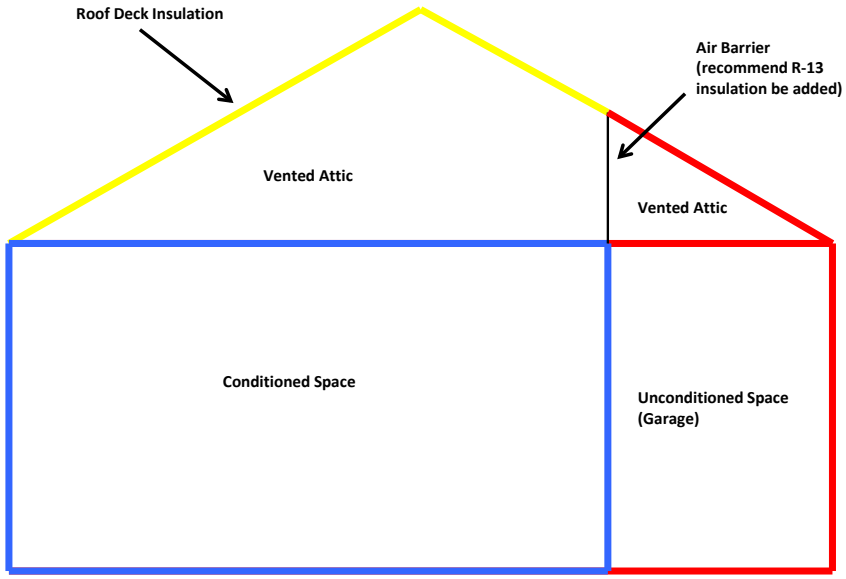

Figure 4 - House with attic insulation extending over conditioned space, attic over conditioned and unconditioned space separated by an air barrier

Pipe Insulation

I am installing a space-conditioning system that uses heated refrigerant for space heating. Should the pipes filled with the heated refrigerant be insulated?

Yes. All pipes carrying refrigerant should be insulated. In this case, insulation is necessary to prevent the refrigerant from losing heat. By reducing heat loss, the equipment does not use extra energy reheating the refrigerant.

Changes are proposed to Sections **120.3** and **150.0(j)2B** of the 2019 Energy Code to require piping for refrigerant to be insulated regardless of the refrigerant being cooled or heated.

I am installing a new solar water-heating system at my house. Which pipes and components of this system need to be insulated?

All of the following must be insulated:

» All new domestic hot water piping (California Plumbing Code, **Section 609.11**)

» Existing accessible piping (**Section 150.2(b)1Gi**)

» Piping from the heating source to the storage tank (**Section 150.0(j)2Aiv**)

» First five feet of cold water piping at the storage tank (**Section 150.0(j)2Ai**)

» Unfired storage tanks (**Section 150.0(j)1**)

Solar water-heating system collector loop piping should be insulated to reduce heat loss. Changes are proposed to **Section 150.0(j)2B** of the 2019 Energy Code to require this piping to be insulated.

If insulation is installed outside of conditioned space, it must be protected from sunlight, moisture, equipment maintenance, and wind per **Section 150.0(j)3**.

See Figure 5 for an example of an insulated solar water-heating system.

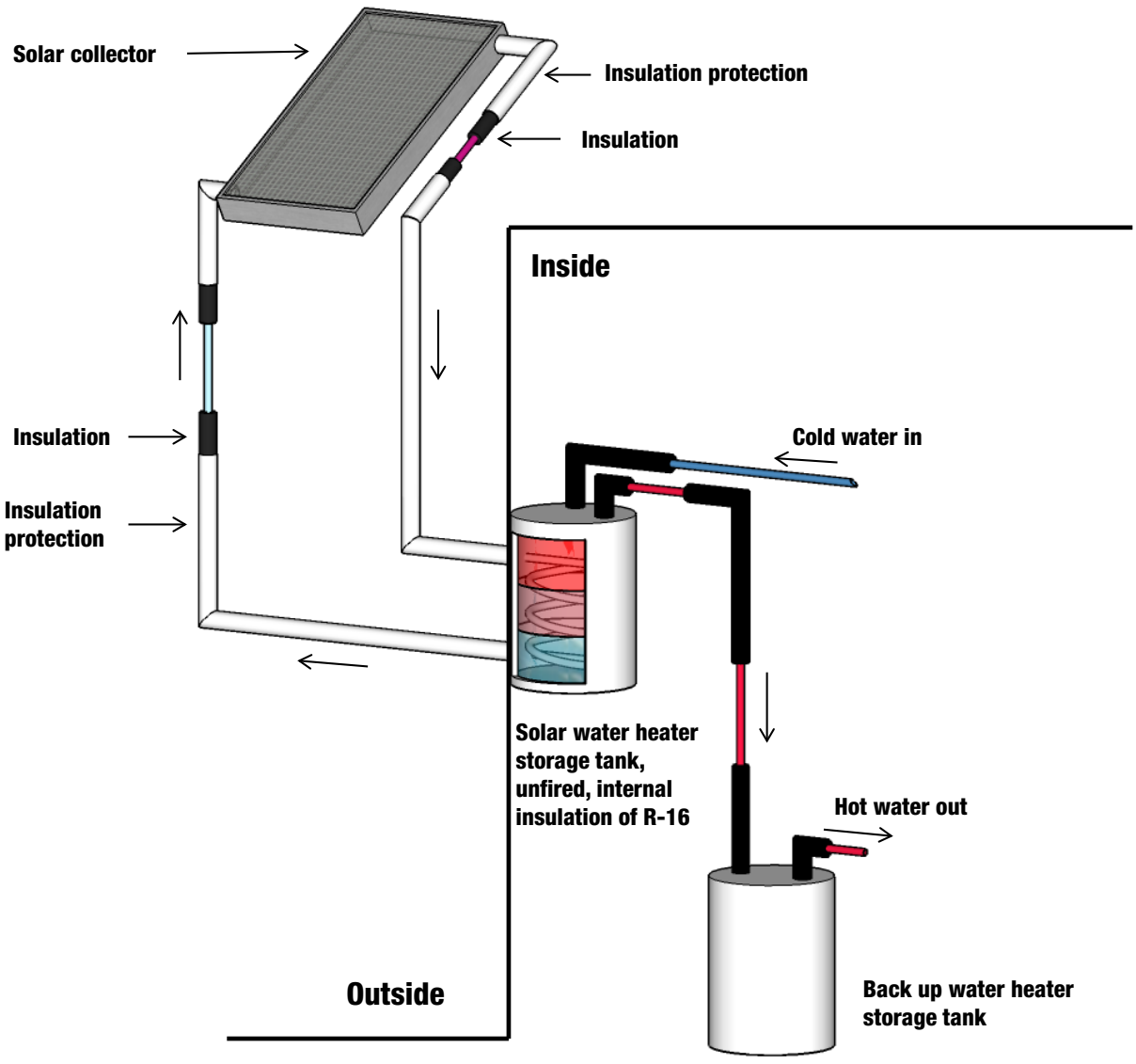

Figure 5 - Solar water-heating system with pipe insulation and insulation protection. Cutouts in insulation and insulation protection are for demonstration purposes only. Where insulation is required, it must be continuous (exceptions may apply).

ENERGY STANDARDS HOTLINE

Available to help with Energy Standards (Title 24, Part 6) questions.

EMAIL

title24@energy.ca.gov

CALL

800-772-3300
Toll free in CA

916-654-5106
Outside CA

HOURS

8 a.m.–12 p.m. and
1 p.m.– 4:30 p.m.

For More Information

Home Energy Rating System:
http://www.energy.ca.gov/HERS/

Acceptance Test Technician Certification Provider Program:
http://www.energy.ca.gov/title24/attcp/

Approved Compliance Software:
http://www.energy.ca.gov/title24/2016standards/2016_computer_prog_list.html

The California Energy Commission welcomes your feedback on Blueprint. Please contact Andrea Bailey at:
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